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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/518,208

06/03/2005

Niclas Wiberg

P16263US1

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7590

01/07/2009

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EXAMINER

CHENG, CHI TANG P

ART UNIT

PAPER NUMBER

2416

MAIL DATE

DELIVERY MODE

01/07/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/518,208	<b>Applicant(s)</b> WIBERG ET AL.	
	<b>Examiner</b> PETER CHENG	<b>Art Unit</b> 2416	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objections*

1. The claim objection issued with respect to Claims 20 and 21 is hereby withdrawn due to Applicant's amendment.

### *Response to Arguments*

2. Applicant's arguments with respect to claims 1, 16 and their dependent claims have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 12, 16, and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al.

5. **As to Claim 1**, Sindhu discloses a method for resource allocation in a packet transmission network including at least one link comprising, the following steps: coordinating functions of Radio Resource Management (RRM) (see, e.g., Fig. 5, "oversubscription engine") and of Active Queue Management (AQM) (see, e.g., Fig. 5,

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“drop engine”) (regarding “coordinating functions”, see, e.g., col. 6, lines 19-22, disclosing that these two functions “may be integrated into a single engine or may otherwise share data between them”; also see col. 6, lines 36-42, disclosing “control logic” for “oversubscription engine”; also see col. 9, lines 38-42, disclosing “control logic” for “drop engine”; also see col. 9, lines 15-27 and col. 10, lines 42-46, together disclosing the interplay between the “oversubscription engine” and the “drop engine”); the RRM function (see, e.g., Fig. 5: “oversubscription engine”) determining whether to allocate more link capacity (see, e.g., Fig. 8; Figs. 9x; col. 7, lines 58-61: “control logic performs [bandwidth oversubscription] processing at ... times, which may be based on certain criteria, such as traffic flow-related criteria”); and allocating more link capacity if possible (see, e.g., col. 8, lines 17-21: “if the average bandwidth used by a queue is less than its statically allocated bandwidth, the unused portion of the bandwidth may be divided among the queues that are permitted to oversubscribe and need extra bandwidth”; also see col. 8, lines 31-39; also see col. 9, lines 48-50), otherwise signaling results of the RRM determination to the AQM function (see, e.g., Fig. 5: “drop engine” corresponding to “AQM function” recited by Applicant; col. 6, lines 19-22: “these engines ... may ... share data between them”), the AQM function (see, e.g., col. 9, lines 28-36; Fig. 13A) alleviating the link congestion if extra bandwidth is needed or taking no action if extra bandwidth is not needed (col. 9, lines 15-27 and col. 10, lines 42-46, together disclosing the interplay between the “oversubscription engine” and the “drop engine”, e.g., the drop probability of a queue is based on a value MAX, which is derived

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from values generated by the oversubscription engine such as the “average bandwidth” of a queue and its “dynamic memory allocated”).

Sindhu does not expressly disclose the RRM function detecting link congestion; signaling results of the RRM determination to the AQM function. Although Sindhu does disclose, generally, “that these two functions may ... share data between them” (col. 6, lines 19-22).

Gorti discloses a bandwidth detection function detecting link congestion (see, e.g., paragraph 32, disclosing determining whether “excess bandwidth” exists by using a “threshold R”, such “threshold” is set with a view to “prevent downstream congestion” (paragraph 3)); signaling results of the bandwidth detection determination to a packet-dropping function (see, e.g., paragraphs 65-68, disclosing adjusting the flow based, in part, on the value of the “excess bandwidth signal B” and the flows are adjusted accordingly by “dropping” “packets or pieces of traffic” (paragraph 78; Fig. 6, 166). Therefore, the excess-bandwidth-detection function and the flow-adjustment-packet-dropping function disclosed in Gorti may correspond to the “oversubscription engine” and the “drop engine”, respectively, as disclosed in Sindhu. Thus, Sindhu and Gorti are combinable to disclose and teach the entire amended claim 1: “a method for resource allocation in a packet transmission network including at least one link comprising, the following steps: coordinating functions of Radio Resource Management (RRM) and of Active Queue Management (AQM); the RRM function detecting link congestion and determining whether to allocate more link capacity; and allocating more link capacity if possible, otherwise signaling results of the RRM determination to the AQM function, the

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AQM function alleviating the link congestion if extra bandwidth is needed or taking no action if extra bandwidth is not needed.”

Sindhu and Gorti are analogous art since both are in the same field of endeavor with respect to efficient management of network resources.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the method with respect to congestion signaling, as disclosed in Gorti, in conjunction with the method as disclosed in Sindhu. The suggestion or motivation would have been to provide a more robust and efficient network. (see, e.g., Sindhu, col. 1, lines 50-52; Gorti, paragraphs 3 and 15).

6. **As to Claim 12**, Sindhu and Gorti discloses the method according to the parent claim 1.

Sindhu further discloses if low usage of a link is detected then (a) determining if it is possible to decrease the link capacity without problems; (b) allocating less link capacity, when possible (see, e.g., Fig. 8; Figs. 9x; col. 8, lines 17-21: “if the average bandwidth used by a queue is less than its statically allocated bandwidth, the unused portion of the bandwidth may be divided among the queues that are permitted to oversubscribe and need extra bandwidth”; also see col. 8, lines 31-39; also see col. 9, lines 48-50)

7. Please note that the motivation statement in Claim 1 is also applicable here.

8. **As to Claim 16**, please see similar rejection for Claim 1.

9. **As to Claim 23**, please see similar rejection above for Claim 12.

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10. **Claims 2-3, 9-11, 17-18, and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al., further in view of U.S. Patent No. 5,748,901 to Afek et al.

11. **As to Claim 2**, Sindhu and Gorti disclose and teach the method as in the parent claim 1.

Afek further discloses the steps of defining in a buffer for said at least one link, a congestion threshold for packet queue size within said buffer (see, e.g., col. 6, ll. 24-47 and ll. 64-67: "the value of delta is easily computed in the output port of each link [partly] by counting the number of cells arriving at the queue of that port over an interval of time ..." and col. 6, ll. 57-63: wherein the value of a threshold MACR is computed based on weighted averages of the values of delta and MACR is used to restrict data rates, and thus, in summary, the threshold MACR is used to alleviate congestion and MACR is defined based on queue size; ALSO, see col. 4, ll. 59-61: "packets are dropped ... when the queue length at a link of the router exceeds a certain threshold"); and using said congestion threshold to detect link congestion when the packet queue size exceeds said congestion threshold (see, e.g., col. 6, ll. 64-67: in order to avoid underutilizing network resources, one could "restrict the sessions by a multiple of delta."; also, see col. 6, ll. 11-14: "setting a maximum allowed cell rate, MACR, equal to a weighted average of the delta and a prior value of MACR..."; ALSO, see col. 4, ll. 59-61: "packets are dropped ... when the queue length at a link of the router exceeds a certain threshold.").

Afek, Sindhu and Gorti are analogous art since both are in the same field of endeavor with respect to efficient management of network resources.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to utilize the method with respect to thresholds, as disclosed in Afek, in conjunction with the method as disclosed in Sindhu and Gorti. The suggestion or motivation would have been to provide a more robust and efficient network. (see, e.g., Sindhu, col. 1, lines 50-52; Gorti, paragraphs 3 and 15; Afek, col. 1, lines 11-21).

12. **As to Claim 3**, Afek, Sindhu and Gorti disclose and teach the method as in the parent claim 2.

Afek further discloses adjusting the congestion threshold depending on link capacity. (col. 6, ll. 11-14, 24-47, 57-63: where delta is defined based on “the unused link capacity” and MACR, the maximum allowed cell rate, is defined based on a weighted average of values of delta and is used to “constrain the rates of session crossing a link”; thus, all of the above disclose that the threshold used, MACR is adjusted according to variations in the link capacity.)

Please note that the motivation statement in Claim 2 is also applicable here.

13. **As to Claim 9**, Sindhu and Gorti disclose and teach the method as in the parent claim 1.

Afek further discloses determining cell resource status (col. 6, ll. 11); if cell congestion is detected then (a) determining that it is necessary to switch down bit rate or rates in at least one link (e.g., col. 6, ll. 24-47 and ll. 64-67: “the rates of sessions that are above delta are reduced towards delta.”) (b) alleviating link congestion using Active

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Queue Management (col. 4, ll. 53-65); (c) switching down said bit rate or rates (e.g., col. 6, ll. 24-47 and ll. 64-67: “the rates of sessions that are above delta are reduced towards delta.”).

Please note that the motivation statement in Claim 2 is also applicable here.

14. **As to Claim 10**, Afek, Sindhu and Gorti disclose and teach the method as in the parent claim 9.

Afek further discloses alleviating link congestion for all links. (see, e.g., col. 5, ll. 64 - col. 6, ll. 14, where the disclosed method is applicable to all links; also see col. 4, ll. 53-65, wherein the RED strategy is applicable also to all links.)

Please note that the motivation statement in Claim 2 is also applicable here.

15. **As to Claim 11**, Afek, Sindhu and Gorti disclose and teach the method as in the parent claim 9.

Afek further discloses alleviating link congestion only for the links where link congestion is likely to occur. (see, e.g., col. 2, ll. 53-60, where “congested” or “very congested” links are restricted by a certain threshold, MACR and “not congested links are left alone.”)

Please note that the motivation statement in Claim 2 is also applicable here.

16. **As to Claim 17**, please see the rejection above for Claim 2.

17. **As to Claim 18**, please see the rejection above for Claim 3.

18. **As to Claim 22**, please see the rejection above for Claim 9.

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19. **Claims 4 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al. and U.S. Patent No. 5,748,901 to Afek et al., further in view of U.S. Patent No. 6, 480,911 to Lu.

20. **As to Claim 4**, Afek, Sindhu and Gorti disclose and teach the method for resource allocation according to the parent claim 2.

Lu discloses adjusting the congestion threshold depending on whether or not a packet is dropped/marked (col. 8, ll. 15-23).

Lu, Sindhu, Gorti and Afek are analogous art because they are from the same field of endeavor with respect to network data transmissions and queuing methods related to network data transmissions.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use whether a packet has been dropped as an indication of whether to adjust the congestion threshold, as disclosed by Lu, in conjunction with the method as disclosed and taught by Afek, Sindhu, and Gorti. The suggestion or motivation would have been to provide a method of handling congestion and maximizing utilization of network resources by employing different queuing technologies. (Lu, col. 1, ll. 10-17, col. 2, ll. 62 - col. 3, ll. 5; Afek, col. 1, ll. 11-2; Sindhu, col. 1, lines 50-52; Gorti, paragraphs 3 and 15).

21. **As to Claim 19**, please see rejection above for Claim 4.

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22. **Claims 5, 6, 13, 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al. and U.S. Patent No. 5,748,901 to Afek et al., in view of the publication "Random Early Detection Gateways for Congestion Avoidance", by S. Floyd and V. Jacobson (IEEE/ACM Transactions on Networking, vol. 1, no. 4, pg. 397-413, August 1993).

23. **As to Claim 5**, Afek, Sindhu, and Gorti discloses the method of resource allocation according to the parent claim 2.

Afek, Sindhu, and Gorti do not expressly disclose adjusting the congestion threshold depending on buffer delay for a packet in the queue.

Floyd discloses adjusting the congestion threshold depending on buffer delay for a packet in the queue. (pg. 404, Section V.C., "the optimal value for [the threshold] depends, in part, on the maximum average delay that can be allowed by the gateway.")

Sindhu, Gorti, Afek and Floyd are analogous art because they are from the same field of endeavor with respect to network congestion control technology employing queuing methods.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to adjust the congestion threshold using the buffer delay, as disclosed by Floyd, in conjunction with the method as disclosed and taught by Afek because Floyd is incorporated by reference in Afek. (Afek, col. 4, ll. 53-65). The suggestion or motivation would have been to provide a more desirable method of handling congestion. (see, e.g., Afek, col. 1, ll. 11-21, 53-55; Floyd, abstract).

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24. **As to Claim 6**, Afek, Sindhu, and Gorti discloses the method of resource allocation according to the parent claim 2.

Afek does not expressly disclose defining in the buffer a maximum threshold and a minimum threshold for packet queue size within said buffer.

Floyd discloses defining in the buffer a maximum threshold and a minimum threshold for packet queue size within said buffer. (pg. 400, Section IV, first paragraph).

Sindhu, Gorti, Afek and Floyd are analogous art because they are from the same field of endeavor with respect to network congestion control technology employing queuing methods.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to adjust the congestion threshold using the buffer delay, as disclosed by Floyd, in conjunction with the method as disclosed and taught by Afek because Floyd is incorporated by reference in Afek. (Afek, col. 4, ll. 53-65). The suggestion or motivation would have been to provide a more desirable method of handling congestion. (see, e.g., Afek, col. 1, ll. 11-21, 53-55; Floyd, abstract).

25. **As to Claim 13**, Afek, Sindhu, and Gorti discloses the method of resource allocation according to the parent claim 1.

Afek does not expressly disclose alleviating link congestion by dropping or marking packets.

Floyd expressly discloses alleviating link congestion by dropping or marking packets. (pg. 400, Section III, fourth paragraph).

Sindhu, Gorti, Afek and Floyd are analogous art because they are from the same field of endeavor with respect to network congestion control technology employing queuing methods.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to adjust the congestion threshold using the buffer delay, as disclosed by Floyd, in conjunction with the method as disclosed and taught by Afek because Floyd is incorporated by reference in Afek. (Afek, col. 4, ll. 53-65). The suggestion or motivation would have been to provide a more desirable method of handling congestion. (see, e.g., Afek, col. 1, ll. 11-21, 53-55; Floyd, abstract).

26. **As to Claim 20**, please see similar rejection for Claim 5 above.

27. **As to Claim 21**, please see similar rejection for Claim 6.

28. **Claims 7 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al., in view of U.S. Patent Application Publication No. 2005/0053081 A1 to Andersson et al.

29. **As to Claim 7**, Sindhu and Gorti discloses the method of resource allocation according to the parent claim 1.

Sindhu and Gorti do not expressly disclose allocating link capacity by changing from a common channel to a dedicated channel.

Andersson discloses allocating link capacity by changing from a common channel to a dedicated channel (see, e.g., paragraph 15 and 71).

Andersson, Sindhu and Gorti are analogous art because they are from the same field of endeavor with respect to providing more efficient and robust telecommunications networks.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to provide more channel or link capacity by switching from a common to a dedicated channel, as disclosed by Andersson, in conjunction with the method as disclosed and taught by Sindhu and Gorti. The suggestion or motivation would have been to provide a method of handling congestion and maximizing utilization of network resources. (Andersson, paragraphs 2 and 14; Sindhu, col. 1, lines 50-52; Gorti, paragraphs 3 and 15).

30. **As to Claim 8**, Sindhu and Gorti disclose and teach the method of resource allocation according to the parent claim 1.

Sindhu and Gorti do not expressly disclose allocating link capacity by changing from a common channel to a dedicated channel.

Andersson discloses allocating link capacity by changing from a channel with a low bit rate to a channel with a higher bit rate. (see, e.g., paragraph 15 and 71).

Please note that the motivation statement in Claim 7 is also applicable here.

31. **Claims 14, 15, 24 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 7,382,793 B1 to Sindhu et al, in view of U.S. Patent Publication No. US 2003/0007452 A1 to Gorti et al. and U.S. Patent No. 5,748,901 to Afek et al., in view of U.S. Patent No. 6,556,578 B1 to Silberschatz et al.

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32. **As to Claim 14**, Sindhu, Gorti, and Afek discloses the resource allocation method according to the parent claim 2.

Afek does not expressly disclose using Active Queue Management separately for each buffer.

Silberschatz discloses using Active Queue Management separately for each buffer. (see, e.g., col. 1, ll. 47-49: “local states of the individual data flows.”; and col. 4, ll. 60-63).

Silberschatz, Sindhu, Gorti and Afek are analogous art since they are both from the same field of endeavor with respect to providing methods of congestion and flow control.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use Active Queue Management separately for each buffer, as disclosed by Silberschatz, in conjunction with the method as disclosed and taught by Afek, Sindhu and Gorti. The suggestion or motivation would have been to provide a method of handling congestion in a fair and optimized fashion. (Silberschatz, col. 2, ll. 37-47; Afek, col. 1, ll. 6-21; col. 4, ll. 53-65; Sindhu, col. 1, lines 50-52; Gorti, paragraphs 3 and 15).

33. **As to Claim 15**, Sindhu, Gorti, and Afek disclose and teach the resource allocation method according to the parent claim 2.

Silberschatz discloses using a general Active Queue Management for a number of buffers (see, e.g., col. 1, ll. 47-49: “local states of the individual data flows.”; and col. 4, ll. 60-63: “local queue size threshold and a buffer occupancy for ... possibly various

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combinations of two or more queues") and controlling the average traffic in the links associated with said buffers (see, e.g., col. 5, ll. 1-8)

Please note that the motivation statement in Claim 14 is also applicable here.

34. **As to Claim 24**, please see similar rejection above for Claim 14.

35. **As to Claim 25**, please see similar rejection above for Claim 15.

### ***Conclusion***

36. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER CHENG whose telephone number is (571)272-9021. The examiner can normally be reached on M-Th, 8:00AM - 5:00PM (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Derrick W. Ferris can be reached on (571)272-3123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. C./

Examiner, Art Unit 2416

/Derrick W Ferris/

Supervisory Patent Examiner, Art Unit 2416